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Summary

An extremely high incidence of reappearing cyst of the pancreas (24.1%; 7 out of 29 patients) was noted in the present survey. However, reappearance could have been avoided in the majority of cases with the use of thorough pre- and peri-operative assessments of the extent of cystic lesion of the pancreas. The recurrence rate after surgical treatment for pseudocysts (13.6%; 3 out of 22 patients) was similar compared with usual recurrence rate of approximately 10 percent¹⁾. If the reappearing cyst is a retention cyst or a pseudocyst, a minimally aggressive procedure should initially be considered to aid its resolution.

A part of this study was reported at the 51st meeting of the Japanese Society for Clinical Surgery on November 2, 1989 at Kobe, Japan.

Introduction

Recently, cystic lesions of the pancreas of various pathologies have been identified quite frequently, principally because of the rapid advance of diagnostic imaging modalities such as computerized tomography (CT) and ultrasonography (US). Therefore, opportunities for surgical corrections of the lesions have increased in frequency. The appropriate operative procedure is selected taking into account factors including the pathogenesis and location of the lesion. However, reappearance of the pancreatic cyst occasionally follows the initial treatment for the lesion. The various sequelae may prove bothersome, particularly the reappearance of cyst following surgical intervention. To our knowledge, detailed studies of series of patients with the latter complication have been few; to determine how to prevent or minimize the reappearance of cysts, we have therefore reviewed the records of patients treated for cystic lesions of the pancreas in our clinic.

Key words: Pancreatic cystic lesions, Reappearing pancreatic cyst, Retention cyst, Pseudocyst, Chronic pancreatitis.
索引語: 膵嚢胞性病変, 再現膵嚢胞, 貯留嚢胞, 仮性嚢胞, 慢性膵炎.

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Table 1 Pathology and location of cystic lesions of the pancreas in 29 patients

	Retention cyst (n=6)	Proliferative cyst (n=1)	Pseudocyst (n=22)
Pancreatic head	1	0	7
Pancreatic body	1	0	6
Pancreatic tail	2	1	9
Multiple	2	0	0

Clinical Materials

From March 1978 to June 1989, a total of 32 patients with cystic lesion of the pancreas were treated surgically in our clinic. Patients with cystic lesion associated with ductal carcinoma or metastatic carcinoma of the pancreas were not included in this group. The postoperative follow-up period for each patient ranged from 6 months to 11 years. Three patients were excluded from the present study. They were a 44-year-old male who underwent incomplete resection of cystadenocarcinoma, a 76-year-old male who died of a postoperative complication of surgery for perforated duodenal ulcer, and a 72-year-old male who died of esophageal carcinoma.

Of the remaining 29 patients, 22 were male and 7 were female. Their ages ranged from 15 to 75 years with an average for males of 48.1 ± 14.5 years (mean \pm SD) and for females of 45.3 ± 9.5 years (mean \pm SD). The pancreatic cystic lesions identified at surgery included 6 retention cysts, one cystadenoma and 22 pseudocysts (Table 1). Patients with associated pancreatic diseases which might have caused their cystic lesions included 23 with chronic pancreatitis, 3 with acute pancreatitis and one with blunt abdominal trauma. Patients with cystadenoma¹⁰⁾ or a retention cyst¹²⁾ had no clearly associated abnormalities of the pancreas.

The size of cysts ranged from 1.0 cm to 25.5 cm in maximum diameter. By location and size, 8 occurred in the head of the pancreas with an average size of 3.9 ± 1.5 cm (mean \pm SD), 7 in the body with an average size of 7.3 ± 5.2 cm (mean \pm SD) and 12 in the tail with an average size of 7.0 ± 6.0 cm (mean \pm SD). Multiple retention cysts were noted in two patients, with maximum diameters 5.0 cm and 3.0 cm, respectively. Initial operations for the cystic lesions included 14 drainage pro-

Table 2 Initial operative procedures for cystic lesions of the pancreas and reappearance of the pancreatic cyst

	Retention	Proliferative	Pseudocyst
Drainage operation (n=14)			
Cyst-gastrostomy			2 (1)
Cyst-jejunostomy*		1 (1)	11 (1)
Resection (n=11)			
Pancreaticoduodenectomy	1		1
Distal pancreatectomy	3 (2)		6 (1)
Drainage plus resection (n=4)			
DuVal operation			2
Other	2 (1)		

* including pancreaticojejunostomy-plused cases, numbers in the parentheses indicate case (s) of reappearing cyst

Table 3 Seven cases of reappearing cyst after surgical treatment for cystic lesions of the pancreas

No.	Patient	Initial surgery	Histology	Interval*	Treatment	Follow-up
1	42 M	Cyst-J, P-J	Pseudo, CP	19 days	Conservative	Resolved
2	36 F	Cyst-gastrostomy	Pseudo, CP	1 year	Resection	Fair
3	38 F	Cyst-J	Cystadenoma	5 years	Resection	Fair
4	58 F	Resection	Retention	10 days	Conservative	Resolved
5	71 M	Resection	Pseudo, CP	3 months	Cyst-J	Fair
6	33 F	Resection	Retention, CP	14 days	Percutaneous drainage	Fair
7	58 M	Cyst-J plus resection	Retention, CP	10 days	Ethanol inj. at laparotomy	Resolved

* between the initial surgery and the reappearance of pancreatic cyst, Cyst-J indicates cyst-jejunostomy, P-J; pancreatico-jejunostomy, Pseudo; pseudocyst, CP; chronic pancreatitis, and Retention; retention cyst.

cedures, 11 resections and 4 which combined drainage and resection (Table 2).

Statistical analysis was done using chi-square statistics.

Results

Within the group of 29 patients with cystic lesions of the pancreas, no significant difference between the ages of males and females was present. During follow-up, seven (24.1%) of the 29 patients have had reappearance of the cystic lesion (Table 3). Three of these were males (13.5% of all males) and 4 were females (57.1% of all females). Reappearance of the cyst was identified in four patients at laparotomy; by histological type, two were pseudocysts and one each were cystadenoma or retention cyst. In the other three patients, pseudocyst was diagnosed by clinical course and by the findings of CT and US.

Of the six patients originally with retention cyst, two subsequently developed pseudocysts (cases 4 and 6) and one a retention cyst (case 7). Of the twenty-two patients originally with pseudocyst, three suffered recurrences (cases 1, 2 and 5). Of the 23 patients with chronic pancreatitis, five (cases 1, 2, 5, 6 and 7) suffered reappearance of cystic lesion of the pancreas. One of the eight patients whose original cyst was located in the head of the pancreas and five of the 13 patients whose cyst was located in the pancreatic tail had reappearance of a cyst.

By operative procedure, three of the patients (21.4%) treated by drainage, three (27.3%) by resection and one (25.0%) by drainage combined with resection had reappearance of the cystic lesion. A 36-year-old female (case 2) was noted to have a recurrent pseudocyst due to narrowing of a cyst-gastrostomy one year following surgery, and a 38-year-old female with cystadenoma (case 3) was found 5 years after cyst-jejunostomy to have a re-enlarged tumor. The other five of these patients were clearly demonstrated to have had reappearance of pancreatic cyst within an interval ranging from 10 days to 3 months following surgery. Clinically, five patients complained of abdominal pain and had transiently elevated serum amylase values.

Treatment for reappearance of cystic lesion of the pancreas was accomplished with laparotomy in 4 patients; of these, resection of the reappearing cyst was carried out in 2 patients (cases 2 and 3), cyst-jejunostomy in one (case 5) and one other patient (case 7) underwent infusion of ethanol into a retention cyst. A 33-year-old female with a giant pseudocyst (case 6) was treated with percutaneous, US-guided drainage. Two patients were given supportive management. Further recurrence of

cystic lesion has not been identified in any of these 7 patients.

Discussion

Among the various classifications of cystic lesions of the pancreas, that of *Howard and Jordan*⁹⁾ had been generally accepted. Recently, however, *Howard*⁸⁾ had made some revision on the previous classification, which divides the lesion into congenital, angiomatous, proliferative, acquired cysts and cysts of uncertain nature. All but one surgically treated cysts of the pancreas in our experience have been acquired cysts, in particular, retention cysts or pseudocysts. Cysts of no other type in this category have been encountered.

The only proliferative cyst considered in the present survey was a cystadenoma; in brief, a 38-year-old female (case 3) had undergone cyst-jejunostomy 5 years before with a histological diagnosis of retention cyst at surgery. Subsequently, she gradually developed a cystic mass in the tail of the pancreas, and a resected specimen was found to be mucinous cystadenoma. In retrospect, the specimen of the cystic wall taken at initial surgery might have been too small to detect the tumor. Although proliferative cysts, especially those of mucinous type, should be removed⁵⁾ errors in treatment for these cysts have been reported²⁰⁾. Cysts of the pancreas, except in the case of confirmed pseudocyst, should be considered possibly proliferative lesions. An adenoma in case 3 located in the tail of the pancreas might easily have been resected at the initial surgery.

Among six patients with reappearing acquired cysts, prevalence of females (50.0% vs. 13.6% in males) was noted. Surgery for retention cysts was followed by a substantial percentage of cyst reappearance (50.0%) compared with surgery for pseudocysts (13.6%). Cysts located in the pancreatic tail subsequently reappeared at a rate of 37.2% compared with a 12.5% rate for head lesions. The average maximum diameter of cysts found at initial surgery was 4.8 ± 1.0 cm (mean \pm SD) in the 6 patients with reappearing cyst which was smaller than the average 6.2 ± 5.4 cm (mean \pm SD) found in 22 patients who had no recurrence. There was no significant difference in these results and cyst reappearance rate between groups of patients with different initial operative procedures. Although these results were not significant, the number of patients studied was too small to strongly support any conclusion. It is, however, remarkable that five of the six reappearing acquired cysts were pseudocysts, and that in five patients chronic pancreatitis was associated with reappearing lesions.

Of the five patients of reappearing pseudocysts, an assessment found that in four failure of operative techniques had caused the complication; in case 2, a narrowed cyst-gastrostomy led to re-enlargement of the drained cyst, and in case 4, so-called spleen-preserving caudal pancreatectomy resulted in development of a pseudocyst around the under pole of the spleen. Although this procedure is occasionally carried out at pancreatectomy^{6,17)}, meticulous removal of the remaining pancreatic tissue at the hilum of the spleen is mandatory. In cases 5 and 6, closure of the main pancreatic duct at caudal pancreatectomy might have been insufficient due to chronic inflammation.

The reappearance of a cyst in case 1 might have been unavoidable; this 42-year-old male with chronic pancreatitis, dilated main pancreatic duct and pancreaticolithiasis underwent Partington's operation including anastomosis to a pseudocyst in the head of pancreas. He suffered obstructive jaundice on the 19th postoperative day and reappearance of another pseudocyst at the head of pancreas was suspected upon US-findings. Because possible preservation of pancreatic function at surgery for chronic pancreatitis is a rule, the drainage procedure used in this case was not a mismatch, and the size of the anastomosis accomplished was sufficient. The incidence of spon-

taneous resolution of pseudocysts has been reported to be 15 percent¹⁹⁾ or 28 percent²⁾. *Mullins et al.*¹¹⁾ stated that so-called acute pseudocysts were more likely to resolve. The reappearing cyst in this patient also resolved spontaneously, perhaps due to subsequent draining into the route established by the pancreaticojejunostomy.

Reappearance of a retention cyst was noted in only one patient. A 58-year-old male (case 7) with chronic pancreatitis and pancreatolithiasis had six multiple retention cysts distributed from the head to the tail of the pancreas. Distal pancreatectomy and cyst- and pancreatico-jejunostomy were carried out and a remaining cyst in the pancreatic head was injected with ethanol. At the 10th postoperative day, he was reexplored because of a bleeding ulcer. During gastrectomy, the ethanol-injected cyst had shrunken; however, development of another retention cyst sized 3 cm was incidentally noted. The cause of multiple retention cysts in this case might have been related to chronic pancreatitis. Relatively aggressive surgery for the gland could not prevent reappearance of a cyst in the insufficiently drained area. Total pancreatectomy might have been considered; however, the patient's abdominal pain was not severe enough to have permitted such a definitive procedure, which would have resulted in extensive functional defects. Therefore, reappearance of the cyst may be permitted in such a patient.

Treatment for reappearing cysts should be selected carefully. Resection is mandatory for a cyst suspected to be proliferative. On the other hand, options exist for the treatment of pseudocysts. Generally, it is preferable to wait 4 to 6 weeks until the pseudocyst wall becomes complete^{1,4)}. Except for cases of spontaneous resolution, treatment for pseudocysts should depend on their phase, acute or chronic, in order to prevent subsequent complications^{7,11)}.

The usually-employed operative maneuver has recently been supplemented by another, the US-guided puncture of a pseudocyst^{14,16)}, which has mainly been used to avoid laparotomy; the results in case 6 using this new procedure were satisfactory. Renal cyst³⁾ and liver cyst^{13,15)} have been successfully treated with injection of ethanol; however, to our knowledge, trial of injection into a pancreatic retention cyst had not been previously noted. In case 7, no cystic lesion in the remnant pancreas could be identified on CT at 8 months following his second surgery. Destructive effects of ethanol to the lining epithelia of a retention cyst are to be expected as are those to the epithelia of renal and liver cysts.

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和文抄録

膵嚢胞性病変手術後嚢胞再現例についての検討

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過去10年余の期間に手術を加えた29例の膵嚢胞性病変の中で7例に膵嚢胞の再現がみられた。男性3例, 女性4例で, 腫瘍性嚢胞の1例以外は, 後天性嚢胞に属する仮性嚢胞5例, 貯留嚢胞1例であった。慢性膵炎に合併の膵嚢胞22例の手術では5例に嚢胞再現がみられた。嚢胞再現の原因として, 選択術式や手術手技が不適切と考えられたものが5例で, 他の2例においては必要十分な術式を施行したにもかかわらず

らず再現がみられた。再現嚢胞の処置は開腹が4例(切除2, 内瘻手術1, エタノール注入1), 保存的療法2例, エコーガイド下経皮穿刺1例で, いずれも良好な経過であった。嚢胞再現の防止には術前術中の膵嚢胞性病変の状態把握が何よりも重要であるが, 貯留嚢胞または仮性嚢胞の形で嚢胞再現が起こったなら, まず第一に, 膵へのより侵襲の軽い処置法を考慮すべきであろう。